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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,373	01/12/2006	Seppo Martikainen	804-40075-US	7827

6123 7590 12/17/2008  
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EXAMINER
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CALANDRA, ANTHONY J

ART UNIT	PAPER NUMBER
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1791

MAIL DATE	DELIVERY MODE
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12/17/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/564,373	<b>Applicant(s)</b> MARTIKAINEN ET AL.	
	<b>Examiner</b> ANTHONY J. CALANDRA	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-7 and 9-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-7 and 9-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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***Detailed Office Action***

1. The communication dated 9/15/2008 has been entered and fully considered.
2. Claims 1, 3, 5, 6, 7, and 9-11 are currently pending. Claims 2, 4, and 8 have been cancelled by the applicant.

***Response to Arguments***

3. Applicant's arguments filed 9/15/2008 have been fully considered but they are not persuasive.

*Applicant argues that no one had earlier appreciated the benefits of using an alkali adjusted fresh polysulfide white liquor in a batch system also using hot white liquor. Applicant contends that hot white liquor having a temperature of 140-180 degrees C that the polysulfide in the fresh polysulfide liquor would not be stable. Applicant further contends that WIZANI does not teach that the polysulfide together with a later hot white liquor displacement.*

WIZANI teaches that PS is added in the WBL stage of an RDH cook, “***The most optimum way to use polysulfide and AQ is to use the polysulfide in the WBL stage and AQ in the HBL stage***” [pg. 419 abstract paragraph 3].

WIZANI discloses that the treatment is used in the WBL, warm black liquor, stage of the RDH process. The RDH process is a semi-batch process that has a set number of steps, as evidenced by SEZGI.

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SEZGI shows that the RDH process of WIZANI has the following sequential steps [see e.g. pg. 1]: *Chip fill; **Warm fill**; Hot fill (hot black liquor fill); **Hot white** and black liquor fill; Time to temperature and time at temperature; Displacement; Blow (or pump out).*

Therefore as WIZANI teaches adding polysulfide to warm fill, WIZANI implicitly teaches that polysulfide is added prior to the hot white liquor treatment. This treatment adds polysulfide separate from the hot white liquor which would degrade polysulfide. Examiner notes that applicant does not claim the temperature of the white liquor in the cooking process.

*Applicant additionally argues that the reference does not state that the polysulfide being provided is a fresh polysulfide liquor.*

WIZANI teaches that PS is added in the WBL stage of an RDH cook, “*The most optimum way to use polysulfide and AQ is to use the polysulfide in the WBL stage and AQ in the HBL stage*” [pg. 419 abstract paragraph 3]. WBL, stands for warm black liquor, therefore WIZANI certainly does contemplate adding polysulfide to the warm black liquor stage of a semi-batch system.

WIZANI et al. discloses that 1.6% polysulfide liquor was added *in addition to* the 21% active alkali charged white liquor, which was slit 3% to the WBL, 3% to the HBL, and 15% to the W.L. cooking stage [see e.g. pg. 422]. Therefore there is a mix of polysulfide and white liquor in the WBL stage, hence polysulfide white liquor [pg. 420 *RDH cooking procedures*].

Applicant argues that WIZANI does not use the term ‘fresh’ to describe polysulfide white liquor. A person of ordinary skill in the art understands the term ‘fresh’ to mean liquor that has been generated or regenerated. Once generated or regenerated liquor has been used in a cooking

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process it is spent liquor. Spent liquor will contain less active chemicals and will contain dissolved organics. WIZANI gives no indication or teaching that the polysulfide liquor used contains anything but the typical polysulfide liquors used in the pulp and paper making industry. A person of ordinary skill in the art would not look at WIZANI and use a 'spent' polysulfide white liquor as they would expect that it would be depleted and have additional interfering organic compounds in it.

Analogous to this argument would be if the applicant used the term 'fresh white liquor' and WIZANI only stated "white liquor". A person of ordinary skill in the art would not refer to "white liquor" as "fresh white liquor" as once the white liquor has been used in the process it is spent and contains lower chemical levels and organics and is known as "weak black liquor". A person of ordinary skill in the art would expect white liquor to be "fresh" unless otherwise lead to believe that the white liquor contains other organic chemicals or has been used in a previous step. A person of ordinary skill in the art would not look at WIZANI and use 'spent' white liquor as they would expect that it would be depleted and have additional interfering organic compounds in it.

Additionally, STIGGSON discloses methods where polysulfide liquor is used in pulping. STIGGSON shows that polysulfide is used pretreatment in kraft pulping (as is the polysulfide in WIZANI) and STIGGSON further discloses that polysulfide is made from oxidizing white liquor or green liquor [pg. 6 penultimate paragraph – pg. 7 first paragraph]. As polysulfide is made from white or green liquors there are a clear and finite number of liquors to generate polysulfide from in the pulp and paper industry. Therefore at the time of the invention it would have been obvious to try either white or green liquor for the production of the polysulfide liquor absent

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evidence of unexpected results. A person of ordinary skill in the art would expect polysulfide from white liquor to be successful as WIZANI as STIGGSON teaches both green and white liquor polysulfide liquors are acceptable. Therefore, even if WIZANI had not teach adding white liquor to the WBL stage, the polysulfide added could still be from white liquor.

### ***Drawings***

4. Based on the cancellation of claim 8, the applicant's drawings are now accepted.

### ***Claim Objections***

5. The objections to the claims have been withdrawn in light of applicant's amendments.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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8. Claims 1, 3, 5, 6, 7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Effect of Pretreatment with Green Liquor, AQ and Polysulfide on the Performance of an Extended Batch System* by WIZANI et al., hereinafter WIZANI et al. as evidenced by *A combined discrete-continuous simulation model of an RDH tank farm* by SEZGI et al., hereinafter SEZGI et al. in view of WIPO Publication 99/14423 STIGSSON et al., hereinafter STIGSSON et al.

As for claim 1 and 3, WIZANI et al. discloses a process for using polysulfide liquor during the pretreatment step of an extended batch delignification process, RDH, which was found to improve the yield (*A batch process for the preparation of kraft pulp with improved Yield from lignin-containing cellulosic material, comprising the steps of* [see e.g. abstract]). WIZANI et al states that the polysulfide can be added to either the WBL or HBL stage of the RDH process and found the highest yield increase was found when adding the polysulfide to the WBL stage (*filling and pressurizing said vessel with impregnation liquor collected from a previous batch, said impregnation liquor admixed with, or preceded by an addition of a volume of polysulfide white liquor* [see e.g. pg. 422]). The WBL stage of the RDH process is the impregnation stage of the cook (*impregnating the cellulosic material with the resulting mixture of impregnation liquor*). WIZANI et al. describes that there is a HBL, hot black liquor, and a cooking liquor stage [see e.g. pg. 422]. WIZANI et al. discloses that it is an RDH process. The RDH process has the remaining instant claimed steps as is further evidenced by SEZGI et al. SEZGI et al. discloses that the RDH process has a hot black liquor fill (*Displacing the impregnation liquor with hot spent cooking liquor and reacting the impregnated cellulosic material with said hot spent liquor* [see e.g. pg 213 and Figure 1]). SEIZGI et al. further disclose

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that the RDH process displaces the hot black liquor with white liquor and cooks the pulp to the proper time at temperature (*displacing hot spent cooking liquor with a volume of hot white liquor and cooking the cellulosic material with said white liquor to a desired degree of delignification* [see e.g. pg. 213 and Figure 1]. SEIZGI et al. finally discloses that an RDH process has a displacement step (*displacing the liquor used for cooking* [see e.g. pg. 213 and Figure 1].

WIZANI et al. discloses that 1.6% polysulfide liquor was added *in addition to* the 21% active alkali, which was split 3% to the WBL, 3% to the HBL, and 15% to the W.L. cooking stage [see e.g. pg. 422]. WIZANI et al. does not disclose the active alkali content of the polysulfide liquor added to the WBL impregnation stage and therefore does not disclose the split of active alkali split between the impregnation and active alkali of the polysulfide liquor and total active alkali. STIGSSON et al. discloses a process for using polysulfide liquor during the impregnation before cooking to form pulp [see e.g. abstract]. STIGGSON et al. discloses that the proper split of polysulfide effective alkali to be about 60% or less effective alkali to the impregnation stage which overlaps with the instant claimed ranges [see e.g. pg. 6]. The split of effective alkali is equivalent to the split of active alkali at the same sulfidity of liquors. At the time of the invention it would have been obvious to use the polysulfide split of STIGGSON et al. in the batch process of WIZANI et al. A person of ordinary skill in the art would have been motivated to improve the process of WIZANI et al. by splitting the alkali charge in the manner taught by STIGGSON et al. as this condition was found suitable for stabilizing undesirable peeling reactions [see e.g. pg. 11]

Examiner notes that effective alkali is equal to  $\text{NaOH} + 1/2 \text{Na}_2\text{S}$  while active alkali is  $\text{NaOH} + \text{Na}_2\text{S}$ . Depending on the method of generating the polysulfide liquor, there may be



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more or less  $\text{Na}_2\text{S}$  thus slightly affecting the percentage active alkali versus effective alkali percentage in the polysulfide white liquor added (instead of being equivalent). However, it would be obvious to further optimize the alkali split of STIGSSON et al. as sodium hydroxide and sodium sulfide profiling are highly influential on pulp yield and splitting the active alkali.

As for claim 5, WIZANI et al. discloses that the polysulfide liquor is added with the impregnation WBL [see e.g. pg 422]. WIZANI et al. does not disclose that the polysulfide liquor should be added before the WBL impregnation treatment. At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the polysulfide liquor before the impregnation liquor. The selection of the ordering of the mixture of ingredients in the absence of unexpected results is prima facie obvious [see e.g. MPEP 2144.04 (IV) (C)]. Additionally, WIZANI et al. states that polysulfide degrades in high temperatures thus a person of ordinary skill in the art would be motivated to charge the polysulfide before the impregnation liquor if the impregnation liquor was hot enough to degrade the polysulfide [see e.g. pg 422].

As for claim 6 and 7, WIZANI et al. discloses that the cooking catalyst, anthraquinone, can be added to either the WBL, HBL, or white liquor cooking stage of the RDH process [see e.g. pg 422].

As for claim 10, WIZANI et al. discloses that alkali must be effectively balanced to have the best performance from a Kraft cook [see e.g. pg. 419]. The WBL liquor of WIZANI is composed of the cooler displacement liquor that was not sent to the HBL tank as evidenced by SEZGI et al. [see e.g. Figures 1 and 2]. Therefore depending on the split of the amount of displacement liquor to the HBL or WBL tank, some liquor meant for the WBL tank could be sent to the HBL tank. A person of ordinary skill in the art would be motivated to send more of the

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WBL liquor to the HBL tank to adjust the concentration of hydroxide and sulfide remaining in the HBL liquor as to better optimize alkali concentration as taught by WIZANI et al [see e.g. pg. 419] charges in different manners are well known in the art [see e.g. WIZANI *Introduction* pg. 419].

9. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Effect of Pretreatment with Green Liquor, AQ and Polysulfide on the Performance of an Extended Batch System* by WIZANI et al., hereinafter WIZANI et al. as evidenced by *A combined discrete-continuous simulation model of an RDH tank farm* by SEZGI et al., hereinafter SEZGI et al. in view of WIPO Publication 99/14423 STIGSSON et al., hereinafter STIGSSON et al. , as applied to claim 1 above, and further in view of WIPO Publication WO 01/25531, PAAKI et al.

As for claim 9, WIZANI et al. teaches pulping wood utilizing a pretreatment of polysulfide during the batch RDH process [see e.g. abstract]. WIZANI et al. does not disclose using impregnation liquor for the first volume of the displacement step. PAAKI et al. discloses using impregnation liquor for the first step of displacement [see e.g. abstract and figure 1]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to use impregnation liquor for the first part of displacement in the RDH process of WIZANI et al. A person of ordinary skill in the art would be clearly motivated to do this as the impregnation liquor contains calcium and by heating it in the digester by early displacement calcium carbonate will form in the digester and not on the evaporator surface [see e.g. abstract].

As for claim 11, WIZANI et al. teaches a WBL tank and a HBL tank. The HBL tank is the tank that houses the spent liquor. WIZANI et al. does not teach a second HBL tank.

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PAAKI et al. discloses a batch process with two hot black liquor tanks (1) and (2) [see e.g. Figure 1]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to use a second black liquor tank of PAAKI et al. in the cooking process of WIZANI et al. A person of ordinary skill in the art would be motivated to do so to segregate liquors with different calcium profiles as spent liquor would only be sent to the second tank when there is low calcium levels [see e.g. pg. 10 lines 5 -15].

### *Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571)

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270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJC/

/Eric Hug/  
Primary Examiner, Art Unit 1791